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Egyptian physicians' lifestyle behaviors and health promotion activities towards patients with chronic non-communicable diseases

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ABSTRACT

Introduction: The primary prevention of chronic non-communicable diseases (NCDs) is based on health promotion activities aiming to protect people against unhealthy lifestyle behaviours. The aim of this study was to assess lifestyles, the perceived level of training on and practicing health promotion among physicians working in Benha City, Egypt. *Materials and methods:* This is a cross-sectional study conducted on physicians working at public health facilities in Benha. A designed electronic questionnaire was employed to collect data on sociodemographic characteristics, lifestyle behaviours, perceived level of training on and practices health promotion among physicians. *Results:* The study recruited 260 physicians (response rate = 67.7%). Their ages ranged between 27 and 70 years. 10.8% of physicians have been ever smoked, and 50% slept 6-8 hours per day. About two-thirds of physicians ate <3 portions of fruit/ vegetable daily and were physically active. Three-quarters were overweight/ obese. Less than one-third were very prepared on counseling for weight control, nutrition, exercise, breast cancer, and cervical cancer. Most physicians advised their patients to eat healthy food and take medication properly. Physical exercise, avoiding smoking, and avoiding alcohol intake were advised by 55.4%, 21.5%, and 3.8%, respectively. Physical activity was associated with providing counselling about nutrition, exercise, and smoking avoidance. *Conclusion:* Considerable proportions of physicians reported not engaging in healthy lifestyle behaviours, which might impact their health and render them less likely to encourage such behaviours in their patients.

Keywords: Physicians; Lifestyle behaviors; Health promotion activities; Non-Communicable Diseases; NCDs; Egypt.

1. INTRODUCTION

Chronic non-communicable diseases (NCDs) e.g., hypertension, cancers, respiratory diseases, and diabetes represent 71% of global deaths (World

Health Organization, 2021). NCDs are predisposed by adverse lifestyle behaviours such as smoking, unhealthy diet, alcohol intake, stress, and sedentary life (Elsheikh et al., 2021). These diseases can affect any age however, they are more common in old age people particularly, in low-and middle-income countries reaching epidemic patterns. Thus, the prevention of NCDs and reduction of premature deaths (deaths between 30 and 69 years old) due to NCDs constituted important components of sustainable development goals by the year 2030 (World Health Organization, 2021; Daar et al., 2007).

The primary prevention and management of NCDs are based on health promotion activities aiming to protect people against predisposing factors such as exposure to tobacco smoke, alcohol intake, excess salt intake, unhealthy food with excess trans-fat, encouraging physical activity, and regulation of work and rest times (Rahman, 2017). It is important for health professionals to practice healthy lifestyle behaviours, including physical activity, healthy food (rich in fruits, vegetables, fish, nuts, and seeds), adequate sleeping (at least 8 hours per day), reduce stress, avoid smoking, and avoid alcohol intake. These behaviours will reduce the occurrence of NCDs and promote wellbeing in health professionals (Engelsman, 2010).

In addition, it has been shown that the engagement in sound lifestyle behaviours would enhance health professionals to provide preventive counselling to their patients and make them more self-confident and more convincing when motivating patients to avoid health-risk behaviours (Frank et al., 2000; Lobelo et al., 2009). A systematic review of published literature on physical exercise among doctors and counselling practices on physical activity between 2000 and 2010 found significant evidence that physicians who practice physical exercise regularly were more likely to provide counselling on exercise to their patients (Karuguti et al., 2011). This was also concluded by the prospective cohort study of Seguimiento Universidad de Navarra (SUN), which found that doctors who were adherent to a healthy Mediterranean diet and physical exercise were more likely involved in patient counselling on a healthy diet and exercise. In addition, doctors who were current or former smokers were unlikely involved in smoking cessation practices (Carlos et al., 2020).

In Egypt, NCDs constitute a substantial burden on the different health, economic and social sectors. They accounted for about 82% of deaths and 67% of premature deaths. Moreover, the Egyptian community-based survey 2011-2012 revealed a progressive increase in the prevalence of adverse behaviours such as smoking, overweight/ obesity, and physical inactivity (World Health Organization Regional Office for the Eastern Mediterranean, 2021). In addition, unsatisfactory physicians' lifestyle was observed where only 44.6% of healthcare providers practice physical exercise (Gabal et al., 2020) and 21.5% of physicians were current smokers (Mostafa & Momen, 2017). This might affect their abilities to actively contribute to the prevention and control of NCDs. There is lacking research on health professionals 'lifestyle behaviours and health promotion activities in Egypt.

This study is the first in Egypt to investigate the different aspects of lifestyle among physicians and their health-promoting activities provided to patients with NCDs.

Aims and objectives

The aim of this study were to reduce the risk and complications of NCDs through better health promotion practices provided to patients by health professionals in Benha City, Egypt.

The specific objectives were as follows:

To assess the lifestyle behaviours of physicians, working at governmental health facilities in Benha City.

To identify health-promoting activities conducted by physicians towards their NCDs patients.

To evaluate the level of training of physicians on the different health-promoting activities

To identify the relationship between physicians' lifestyle and health promotion practices.

2. MATERIALS AND METHODS

Study design

This is a questionnaire-based cross-sectional study

Study setting

The field work was carried out during November and December 2020 on physicians working at governmental health facilities in Benha City, Egypt. Benha is the Capital of Qalyubiya Governorate, 45 Km. north of Cairo. It has a population of 174,518 in 2018 and its surface area is 10.9 Km^2 (Central Agency for Public Mobilization and Statistics, 2018). In Benha, public health facilities comprised two general hospitals (Benha Teaching Hospital and Benha University Hospital), five specialized hospitals (Benha Children Specialist Hospital, Chest Hospital, Fever Hospital, Ophthalmic Hospital, and Dermatology and Leprosy Hospital), and four Primary Health Centres (PHCs).

Sample size estimation

The minimal sample for this study was estimated using the following formula:

$$\text{Sample size} = \frac{Z_{1-\alpha/2}{}^2 P(1-P)}{d^2}$$

Where

$Z_{1-\alpha/2}$= 1.96 at 95% confidence level and 5% type 1 error (P<0.05).

P= the expected proportion based on previous studies.

d= the absolute error (0.05)

The expected proportion was considered 50% since there were no previous studies in Egypt and to maximize the sample size. The calculated sample size was 384.

Sampling method

One general hospital, one specialty hospital, and one PHC were randomly selected. Physicians were chosen from the selected health facilities using the systematic sampling technique from physician lists.

Inclusion criteria

Physicians working at governmental health facilities in Benha City, who were caring for patients with NCDs, had work experience more than one year, and accept to take part in this study were eligible for the study.

Exclusion criteria

Physicians with work experience of less than one year, not dealing with patients with NCDs, and those who were on leave during the period of the study were excluded.

Ethical considerations

This study was done in accordance of the Helsinki declaration of the ethical principles for human research and was approved by the Research Ethics Committee of Benha Faculty of Medicine (RC 11-8-2021). All participants were asked to give consent to participate in the study. This was an informed consent, which included all details about the study (title, objectives, methods, expected benefits and risks, and confidentiality of data).

Data collection tools

A designed questionnaire was developed based on previous relevant studies (Hallal et al., 2010; Hidalgo et al., 2016). A telephone interview and a supplementary online link, using Google form, were used to collect data. The questionnaire collects data on the following:

Sociodemographic characteristics: These comprised items such as age, gender, work experience, marital status, and self-reported health status.

Body Mass Index (BMI): Participants were inquired to report their weight and height, and their BMI was calculated by dividing weight in kilograms by height in square meters.

Health professionals' lifestyle *behaviours*: Physicians were asked about i) smoking status (ever smoker vs. never smoker), ii) hours of sleep per day, iii) number of portions of fruits/vegetables eaten per day, iv) the number of hours they spend watching TV on a typical weekend, v) alcohol consumption (yes vs. no), and vi) physical activity, according to the International Physical Activity Questionnaire (IPAQ) (Craig et al., 2003; Hallal et al., 2010) that inquiries on physical exercise in the previous seven days as regards the number of days you practiced moderate/ vigorous exercises and the duration of physical activity in minutes per day. Physically inactive participants did not spend ≥ 150 minutes per week doing moderate-to-vigorous physical activity.

The level of training of health professionals on health promotion activities: Physicians were asked about their level of training on health-promoting activities regarding nutrition, exercise, weight control, breast cancer, and cervical cancer. They were asked to classify their preparedness for health-promoting activities as "unprepared", "somewhat prepared", or "very prepared."

Health promoting activities: Physicians were asked whether they advise their patients with NCDs, such as obesity, dyslipidaemia, hypertension, diabetes type 2, and cancer e.g., breast cancer and cervical cancer, to eat healthy food, practice physical exercise, avoid smoking, avoid alcohol intake, and to take treatment properly (yes *vs*. no).

Data management

The collected data were described as frequency and percentage for categorical data and mean ± Standard Deviation (SD) and range for numerical data. The Chi-square test (X^2) and the Fisher Exact Test (FET) were used to compare between the different study groups as appropriate. Statistical significance was considered at $P<0.05$. All statistical analyses were executed using the computerized statistical package STATA/SE version 11.2 for Windows.

3. RESULTS

The study recruited 260 physicians (response rate = 67.7%) from the different governmental health facilities (General hospitals (48.1%), specialty hospitals (42.7%), and PHCs (9.2%)) in Benha City. Their ages ranged from 27 to 70 years old, and their average age was 36 (±7.4) years, females accounted for 58.1%, and most participants were married (83.5%). The proportions of physicians who had master and doctorate degrees were 48.55 and 43.1%, respectively. Their work experience ranged between 3 and 45 years with a mean of 12.2 (±7.7) years. 61.5% described their health status as regular/ good, 32.3% as very good/ excellent, and 6.1% as bad (Table 1).

Table 1 Sociodemographic characteristics of the studied physicians

Characteristics		Total number of physicians =260	
		No.	%
Age (years)	Mean ±SD; (range)	36.0±7.4; (27-70)	
	<35	135	51.9
	≥35	125	48.1
Gender	Female	151	58.1
	Male	109	41.9
Marital status	Divorced/ widowed	23	8.8
	Married	217	83.5
	Single	20	7.7
Type of health facility	General hospital	125	48.1
	Primary health centre	24	9.2
	Specialized hospital	111	42.7
Educational qualification	Doctorate	112	43.1
	Master	126	48.5
	Bachelor	22	8.5
Work experience (years)	Mean ±SD; (range)	12.2±7.7; (3-45)	
	<5	14	5.4
	5-15	161	61.9
	≥15	85	32.7
Describe your health status	Bad	16	6.1
	Regular/ good	160	61.5
	Very good/ excellent	84	32.3

Regarding the lifestyle behaviors of studied physicians (Table 2), 89.2% have never smoked before, their average sleep duration was 6.8 (±1.3) hours, the average number of fruits/ vegetables portions consumed per day was 2.2 (±1.5). The average time one spent watching television on normal weekends was 3.6 (±3.70 hours. Alcohol intake was not reported by any physicians. About two-thirds of studied physicians were physically active (practiced moderate/ severe physical activities for ≥ 150 minutes/ week). Their average BMI was 28.4 (±5.6) kg/m^2.

Self-perception for preparedness on health promotion activities by studied physicians is shown in Figure 1. More than half stated that they are somewhat prepared for health promotion activities for weight control, physical exercise, and proper nutrition. While 53.8% and 60.4% were unprepared for health promotion activities against breast and cervical cancer, respectively. Smaller proportions of physicians were very prepared on counseling for weight control (32.7%), nutrition (24.6%), exercise (22.3%), breast cancer (10.8%), and cervical cancer (10.4%).

Table 2 Lifestyle behaviours among studied physicians

Lifestyle behaviours		Total number of physicians =260	
		%	No.
Smoking status	Ever smoker	28	10.8
	Never smoker	232	89.2
Average sleep duration per day in hours	Mean ±SD; (range)	6.8±1.3; (2-10)	
	<6	36	13.8
	6-8	131	50.4
	≥8	93	35.8
Average number of fruits/vegetables portions consumed per day	Mean ±SD; (range)	2.2±1.5; (0-8)	
	<3	180	69.2
	3-	50	19.2
	≥5	30	11.5
Time watching TV on a regular weekend in hours	Mean ±SD; (range)	3.6±3.7; (0-18)	
	<3	124	47.7
	3-5	77	29.6
	≥5	59	22.7
Alcohol consumption	No	260	100.0
	Yes	0	0.0
Physical activity [a]	Active	174	66.9
	Inactivity	86	33.1
BMI (kg/m^2)	Mean ±SD; (range)	28.4±5.6; (19.0-54.1)	
	Normal weight (18.5-24.9)	68	26.1
	Overweight (25.0-29.9)	106	40.8
	Obese (≥30.0)	86	33.1

a: Physical activity= practice moderate/severe physical activities for ≥150 minutes/ week;
Physical inactivity= do not spend ≥150 minutes/ week doing moderate/severe physical activity

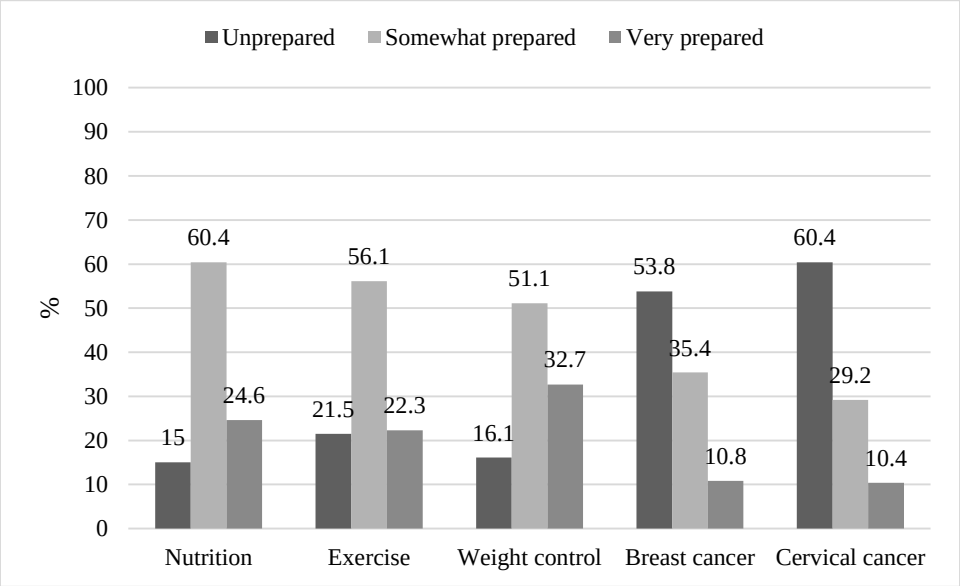

Figure 1 Self-perception of preparedness on health promotion activities among studied physicians

Figure 2 demonstrates the frequency distribution of health promotion activities provided by studied physicians to patients with NCDs (obesity, dyslipidemia, hypertension, type-2-diabetes, cervical, and breast cancers). The vast majority (95.4%) advised their patients to eat healthy food and 83.5% instructed patients to take medication properly. Physical exercise, avoiding smoking, and avoiding alcohol intake were instructed to patients by 55.4%, 21.5%, and 3.8%, respectively.

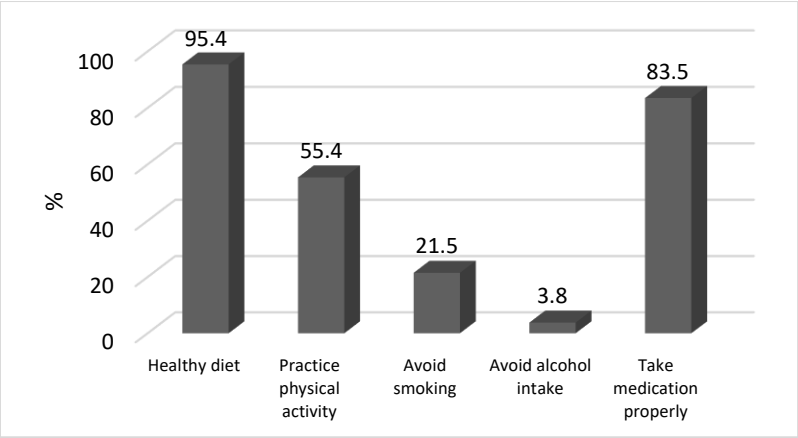

Figure 2 Health promotion activities provided by studied physicians to patients with chronic non-communicable diseases (obesity, dyslipidaemia, hypertension, type-2 diabetes, cervical and breast cancers)

Table 3 Variations in physicians' lifestyle behaviours by smoking status, average sleeping hours per day, and average number of fruits/vegetables portions consumed daily

Characteristics	Smoking status		Average sleep duration per day in hours			Average number of fruits/vegetables portions consumed per day		
	Ever smoker (n.=28)	Never smoker (n.=232)	<6 (n.=36)	6-8 (n.=131)	≥8 (n.=93)	<3 (n.=180)	3-5 (n.=50)	≥5 (n.=30)
Age (years)	**		***					
<35	8(28.6)	127(54.7)	30(83.3)	56(42.7)	49(52.7)	96(53.3)	27(54.0)	12(40.0)
≥35	20(71.4)	105(45.3)	6(16.7)	75(57.2)	44(47.3)	84(46.7)	23(46.0)	18(60.0)
Gender	***					***		
Female	2(7.1)	149(64.2)	22(61.1)	74(56.5)	55(59.1)	110(61.1)	35(70.0)	6(20.0)
Male	26(92.9)	83(35.8)	14(38.9)	57(43.5)	38(40.9)	70(38.9)	15(30.0)	24(80.0)
Marital status			**					
Divorced/ widowed	2(7.1)	21(9.0)	8(22.2)	6(4.6)	9(9.7)	16(8.9)	5(10.0)	2(6.7)
Married	26(92.9)	191(82.3)	22(61.1)	115(87.8)	80(86.0)	148(82.2)	45(90.0)	24(80.0)
Single	0(0.0)	20(8.6)	6(16.7)	10(7.6)	4(4.3)	16(8.9)	0(0.0)	4(13.3)
Type of health facility	**							
General hospital	8(28.6)	117(50.4)	10(27.8)	65(49.6)	50(53.8)	89(49.4)	22(44.0)	14(46.7)
Primary health centre	0(0.0)	24(10.3)	6(16.7)	12(9.2)	6(6.4)	22(12.2)	2(4.0)	0(0.0)
Specialized hospital	20(71.4)	91(39.2)	20(55.6)	54(41.2)	37(39.8)	69(38.3)	26(52.0)	16(53.3)
Educational qualification								
Doctorate	14(50.0)	98(42.2)	12(33.3)	63(48.1)	37(39.8)	76(42.2)	18(36.0)	18(60.0)
Master	14(50.0)	112(48.3)	22(61.1)	60(45.8)	44(47.3)	86(47.8)	30(60.0)	10(33.3)
Bachelor	0(0.0)	22(9.5)	2(5.6)	8(6.1)	12(12.9)	18(10.0)	2(4.0)	2(6.7)
Work experience (years)	*		*					
<5	0(0.0)	14(6.0)	6(16.7)	4(3.0)	4(4.3)	10(5.6)	2(4.0)	2(6.7)
5-15	12(42.9)	149(64.2)	24(66.7)	78(59.5)	59(63.4)	114(63.3)	33(66.0)	14(46.7)
≥15	16(57.1)	69(29.7)	6(16.7)	49(37.4)	30(32.3)	56(31.1)	15(30.0)	14(46.7)
Describe your health status				*				
Bad	0(0.0)	14(6.03)	6(16.7)	4(3.0)	4(4.3)	10(5.6)	2(4.0)	2(6.7)
Regular/ good	14(50.0)	147(63.4)	24(66.7)	78(59.5)	59(63.4)	114(63.3)	33(66.0)	14(46.7)
Very good/ excellent	14(50.0)	71(30.6)	6(16.7)	49(37.4)	30(32.3)	56(31.1)	15(30.0)	14(46.7)

Data were presented as n (%); The Chi-square test and Fisher exact test were used for comparisons as appropriate;
* p<0.05; ** p<0.01; *** p<0.001

Table 4 Variations in physicians' lifestyle behaviours by duration of watching TV on regular weekends, physical activity, and Body Mass Index (BMI)

Characteristics	Time watching TV on a regular weekend in hours			Physical activity [a]		BMI (kg/m²)		
	<3 (n.=124)	3-5 (n.=77)	≥5 (n.=59)	Inactive (n.=86)	Active (n.=174)	Normal weight (18.5-24.9) (n.=68)	Overweight (25.0-29.9) (n.=106)	Obese (≥30.0) (n.=86)
Age (years)	***			*		***		
<35	78(62.9)	26(33.8)	31(52.5)	35(40.7)	100(57.5)	48(70.6)	55(51.9)	32(37.2)
≥35	46(37.1)	51(66.2)	28(47.5)	51(59.3)	74(42.5)	20(29.4)	51(48.1)	54(62.8)
Gender	**					***		
Female	76(61.3)	32(41.6)	43(72.9)	43(50.0)	108(62.1)	58(85.3)	59(55.7)	34(39.5)
Male	48(38.7)	45(58.4)	16(27.1)	43(50.0)	66(37.9)	10(14.7)	47(44.3)	52(60.5)
Marital status	***			*		***		
Divorced/ widowed	6(4.8)	6(7.8)	11(18.6)	13(15.1)	10(5.7)	0(0.0)	17(16.0)	6(7.0)
Married	108(87.1)	71(92.2)	38(64.4)	69(80.2)	148(85.1)	56(82.3)	89(84.0)	72(83.7)
Single	10(8.1)	0(0.0)	10(16.9)	4(4.6)	16(9.2)	12(17.6)	0(0.0)	8(9.3)
Type of health facility	*			**		***		
General hospital	49(39.5)	48(62.3)	28(47.5)	37(43.0)	88(50.6)	52(76.5)	49(46.2)	24(27.9)
Primary health centre	14(11.3)	2(2.6)	8(13.6)	2(2.3)	22(12.6)	4(5.9)	14(13.2)	6(7.0)
Specialized hospital	61(49.2)	27(35.1)	23(39.0)	47(54.6)	64(36.8)	12(17.6)	43(40.6)	56(65.1)
Educational qualification	***			**				
Doctorate	36(29.0)	51(66.2)	25(42.4)	48(55.8)	64(36.8)	22(32.3)	52(49.1)	38(44.2)
Master	78(62.9)	20(26.0)	28(47.46)	28(32.6)	98(56.3)	38(55.9)	48(45.3)	40(46.5)
Bachelor	10(8.1)	6(7.8)	6(10.2)	10(11.6)	12(6.9)	8(11.8)	6(5.7)	8(9.3)
Work experience (years)	*			**		***		
<5	8(6.4)	2(2.6)	4(6.8)	4(4.6)	10(5.7)	4(5.9)	2(1.9)	8(9.3)
5-15	86(69.3)	38(49.3)	37(62.7)	41(47.7)	120(69.0)	50(73.5)	73(68.9)	38(44.2)
≥15	30(24.2)	37(48.0)	18(30.5)	41(47.7)	44(25.3)	14(20.6)	31(29.2)	40(46.5)
Describe your health status	*			*				
Bad	8(6.4)	2(2.6)	4(6.8)	10(11.6)	6(3.45)	6(8.8)	4(3.8)	6(7.0)
Regular/ good	86(69.3)	38(49.3)	37(62.7)	52(60.5)	108(62.1)	42(61.8)	60(56.6)	58(67.4)
Very good/ excellent	30(24.2)	37(48.0)	18(30.5)	24(27.9)	60(34.5)	20(29.4)	42(39.6)	22(25.6)

Data were presented as n (%); The Chi-square test and Fisher exact test were used for comparisons as appropriate; * p<0.05; ** p<0.01; *** p<0.001; a: Physical activity= practice moderate/severe physical activities for ≥150 minutes/ week; Physical inactivity= do not spend ≥150 minutes/ week doing moderate/severe physical activity

Variations in lifestyle behaviors by the Sociodemographic characteristics of studied physicians are shown in Tables 3 and 4. There were significant differences in the proportions of ever smokers and never smokers by physicians' age (p<0.01), gender (p<0.001), the type of health facility (p<0.01), and work experience (p<0.05). The average sleep duration per day was varied significantly by age of physicians (p<0.001), marital status (p<0.01), work experience (p<0.05), and health status (p<0.05). The difference between male and female physicians as regard the average number of fruits/ vegetables portions consumed daily was statistically significant (p<0.001). The average number of hours watching TV on weekends varied significantly by age, marital status, and educational qualification at p<0.001, gender at p<0.01, and the type of health facility, work experience, and health status at p<0.05. The proportions of physically active physicians varied significantly by their age, marital status, and health status at p<0.05. The proportions of physically active physicians varied significantly by the type of health facility, educational qualification,

and work experience at p<0.01. There were statistically significant differences in BMI by physicians' age, gender, marital status, the type of health facility, and work experience at p<0.001.

Table 5 shows variations in health-promoting activities by the sociodemographic characteristics of studied physicians. The proportion of physicians who reported providing counseling about a healthy diet showed significant difference (p<0.05) by marital status and educational qualification. The proportions of physicians who advised their patients to practice physical exercise varied significantly by their marital status, educational qualification, and work experience at p<0.01 and health status at p<0.05. Counseling about avoiding smoking varied significantly by physicians' age and work experience (p<0.05), and educational qualification (p<0.01). Statistically significant differences in the proportions of physicians who provide advice to take medications properly by work experience (p<0.05) and to avoid alcohol by educational qualification (p<0.01) were also noticed.

Table 5 Variations in health-promoting activities provided by studied physicians by Sociodemographic characteristics

Characteristics	Health promotion activities									
	Healthy diet		Practice physical exercise		Avoid smoking		Avoid alcohol		Take medications properly	
	No (n.=12)	Yes (n.=248)	No (n.=116)	Yes (n.=144)	No (n.=204)	Yes (n.=56)	No (n.=250)	Yes (n.=10)	No (n.=43)	Yes (n.=217)
Age (years)					*					
<35	6(50.0)	129(52.0)	57(49.1)	78(54.2)	99(48.5)	36(64.3)	129(51.6)	6(60.0)	27(62.8)	108(49.8)
≥35	6(50.0)	119(48.0)	59(50.9)	66(45.8)	105(51.5)	20(35.7)	121(48.4)	4(40.0)	16(37.2)	109(50.2)
Gender										
Female	8(66.7)	143(57.7)	71(61.2)	80(55.6)	119(58.3)	32(57.1)	143(57.2)	8(80.0)	23(53.5)	128(59.0)
Male	4(33.3)	105(42.3)	45(38.8)	64(44.4)	85(41.7)	24(42.9)	107(42.8)	2(20.0)	20(46.5)	89(41.0)
Marital status	*		**							
Divorced/ widowed	0(0.0)	23(9.3)	17(14.7)	6(4.2)	21(10.3)	2(3.6)	23(9.2)	0(0.0)	3(7.0)	20(9.2)
Married	8(66.7)	209(84.3)	95(81.9)	122(84.7)	167(81.9)	50(89.3)	209(83.6)	8(80.0)	36(83.7)	181(83.4)
Single	4(33.3)	16(6.4)	4(3.4)	16(11.1)	16(7.8)	4(7.1)	18(7.2)	2(20.0)	4(9.3)	16(7.4)
Type of health facility										
General hospital	8(66.7)	117(47.2)	51(44.0)	74(51.4)	95(46.6)	30(53.6)	123(49.2)	2(20.0)	18(41.9)	107(49.3)
Primary health centre	2(16.7)	22(8.9)	14(12.1)	10(6.9)	18(8.8)	6(10.7)	24(9.6)	0(0.0)	4(9.3)	20(9.2)
Specialized hospital	2(16.7)	109(43.9)	51(44.0)	60(41.7)	91(44.6)	20(35.7)	103(41.2)	8(80.0)	21(48.8)	90(41.5)
Educational qualification	*		**		**		**			
Doctorate	2(16.7)	110(44.3)	50(43.1)	62(43.1)	96(47.1)	16(28.6)	112(44.8)	0(0.0)	19(44.2)	93(42.9)
Master	6(50.0)	120(48.4)	64(55.2)	62(43.1)	96(47.1)	30(53.6)	116(46.4)	10(100.0)	18(41.9)	108(49.8)
Bachelor	4(33.3)	18(7.3)	2(1.7)	20(13.9)	12(5.9)	10(17.9)	22(8.8)	0(0.0)	6(13.9)	16(7.4)
Work experience (years)			**		*				*	
0-5	0(0.0)	14(5.6)	0(0.0)	14(9.7)	12(5.9)	2(3.6)	12(4.8)	2(20.0)	6(13.9)	8(3.7)
5-15	8(66.7)	153(61.7)	77(66.4)	84(58.3)	117(57.3)	44(78.6)	155(62.0)	6(60.0)	27(62.8)	134(61.7)
≥15	4(33.3)	81(32.7)	39(33.6)	46(31.9)	75(36.8)	10(17.9)	83(33.2)	2(20.0)	10(23.3)	75(34.6)
Describe your health status			*							
Bad	0(0.0)	16(6.4)	12(10.3)	4(2.8)	14(6.9)	2(3.6)	16(6.4)	0(0.0)	2(4.6)	14(6.4)
Regular/ good	10(83.3)	150(60.5)	66(56.9)	94(65.3)	118(57.8)	42(75.0)	154(61.6)	6(60.0)	27(62.8)	133(61.3)
Very good/ excellent	2(16.7)	82(33.1)	38(32.8)	46(31.9)	72(35.3)	12(21.4)	80(32.0)	4(40.0)	14(32.6)	70(32.3)

Data were presented as n (%); The Chi-square test and Fisher exact test were used for comparisons as appropriate;
* p<0.05; ** p<0.01; *** p<0.001

Differences in health promotion activities in studied physicians by their lifestyle behaviors are shown in Table 6. Counseling about a healthy eating was associated with time watching TV and BMI at p<0.01 and physical activity at p<0.05. Counseling about

physical exercise was associated with the physical activity of physicians ($p<0.01$) and the number of fruit/ vegetable portions consumed per day ($p<0.05$). Physical activity of physicians was associated with providing advice to avoid smoking ($p<0.001$). Sleep duration, the number of fruit/ vegetable portions consumed daily, and time watching TV were associated with counseling about avoiding alcohol intake at $p<0.01$. Counseling to take medications correctly was associated with daily sleep duration ($p<0.01$) and the number of fruit/ vegetable portions consumed daily ($p<0.05$).

Table 6 Variations in health-promoting activities provided by studied physicians by their lifestyle behaviours

Lifestyle behaviours	Health promotion activities									
	Healthy diet		Practice physical exercise		Avoid smoking		Avoid alcohol		Take medications properly	
	No (n.=12)	Yes (n.=248)	No (n.=116)	Yes (n.=144)	No (n.=204)	Yes (n.=56)	No (n.=250)	Yes (n.=10)	No (n.=43)	Yes (n.=217)
Smoking status										
Ever smoker	0(0.0)	28(11.3)	14(12.1)	14(9.7)	20(9.8)	8(14.3)	28(11.2)	0(0.0)	6(13.9)	22(10.1)
Never smoker	12(100.0)	220(88.7)	102(87.9)	130(90.3)	184(90.2)	48(85.7)	222(88.8)	10(100.0)	37(86.0)	195(89.9)
Average sleep duration per day in hours							**		**	
<6	0(0.0)	36(14.5)	18(15.5)	18(12.5)	26(12.7)	10(17.9)	36(14.4)	0(0.0)	8(18.6)	28(12.9)
6-8	10(83.3)	121(48.8)	59(50.9)	72(50.0)	105(51.5)	26(46.5)	121(48.4)	10(100.0)	12(27.9)	119(54.8)
≥8	2(16.7)	91(36.7)	39(33.6)	54(37.5)	73(35.8)	20(35.7)	93(37.2)	0(0.0)	23(53.5)	70(32.3)
Average number of fruits/ vegetables portions consumed per day			*				**		*	
<3	10(83.3)	170(68.5)	72(62.1)	108(75.0)	142(69.6)	38(67.9)	176(70.4)	4(40.0)	22(51.2)	158(72.8)
3-5	2(16.7)	48(19.3)	24(20.7)	26(18.1)	40(19.6)	10(17.9)	44(17.6)	6(60.0)	13(30.2)	37(17.0)
≥5	0(0.0)	30(12.1)	20(17.2)	10(6.9)	22(10.8)	8(14.3)	30(12.0)	0(0.0)	8(18.6)	22(10.1)
Time watching TV on a regular weekend in hours	**						**			
<3	12(100.0)	112(45.2)	52(44.8)	72(50.0)	94(46.1)	30(53.6)	114(45.6)	10(100.0)	20(46.5)	104(47.9)
3-5	0(0.0)	77(31.0)	35(30.2)	42(29.2)	63(30.9)	14(25.0)	77(30.8)	0(0.0)	8(18.6)	69(31.8)
≥5	0(0.0)	59(23.8)	29(25.0)	30(20.8)	47(23.0)	12(21.4)	59(23.6)	0(0.0)	15(34.9)	44(20.3)
Physical activity*	*		**		***					
Inactive	0(0.0)	86(34.7)	50(43.1)	36(25.0)	80(39.2)	6(10.7)	84(33.6)	2(20.0)	17(39.5)	69(31.8)
Active	12(100.0)	162(65.3)	66(56.9)	108(75.0)	124(60.8)	50(89.3)	166(66.4)	8(80.0)	26(60.5)	148(68.2)
BMI (kg/m2)	**									
Normal weight (18.5-24.9)	8(66.7)	60(24.2)	24(20.7)	44(30.6)	54(26.5)	14(25.0)	66(26.4)	2(20.0)	10(23.3)	58(26.7)
Overweight (25.0-29.9)	2(16.7)	104(41.9)	56(48.3)	50(34.7)	78(38.2)	28(50.0)	102(40.8)	4(40.0)	17(39.5)	89(41.0)
Obese (≥30.0)	2(16.7)	84(33.9)	36(31.0)	50(34.7)	72(35.3)	14(25.0)	82(32.8)	4(40.0)	16(37.2)	70(32.3)

Data were presented as n (%); The Chi-square test and Fisher exact test were used for comparisons as appropriate; * $p<0.05$; ** $p<0.01$; *** $p<0.001$; a: Physical activity= practice moderate/severe physical activities for ≥150 minutes/ week; Physical inactivity= do not spend ≥150 minutes/ week doing moderate/severe physical activity

4. DISCUSSION

This observational cross-sectional study was conducted on 260 physicians working at public health facilities (primary health care units, general hospitals, and specialty hospitals) in Benha City, Egypt, to portrait their lifestyle behaviours and their impacts on health-promoting activities provided to NCDs patients.

Lifestyle behaviours

In this study, 10.8% of physicians have been ever smokers. A higher prevalence of smoking was noticed among male physicians, ≥ 35 years old, those working at specialty hospitals, and with longer work experience. The prevalence of smoking in the current study was lower than previously recorded rates in Egypt (Fouda et al., 2018; Mostafa & Momen, 2017; Radwan et al., 2012), which might be due to the greater proportion of female participants (58.1%), meanwhile the proportion of ever smokers among male participants was 23.8% (26 out of 109).

Generally, smoking is uncommon among females in Egypt as an Arabic and Eastern country (Fouda et al., 2018). Smoking prevalence in Egypt ranged between 19.7% (World Health Organization, 2010) to 30% (Khattab et al., 2012). Radwan et al., (2012) recorded smoking prevalence among Egyptian physicians, where 12.5% of male physicians were current smokers and 5% were ex-smokers, while <1% of female physicians have ever been smokers. Moreover, 21.5% out of 521 physicians were current smokers and 8.3% quitted smoking. Smoking was more prevalent among men, who were above 30 years old, and those who had postgraduate qualifications ($p<0.001$) (Mostafa & Momen, 2017). Meanwhile, a lower prevalence (8.4%, n= 27) was reported among primary healthcare professionals in Riyadh, with more smokers among physicians compared to nurses. This low level was explained by the smoking prohibition and local policy in the selected centres (Al-Ateeq & AlArawi, 2014). Moreover, in Brazil, tobacco smoking among healthcare workers was recorded as 7.4% in Community Health Workers (CHWs), 5.6% in physicians, and 4.9% in nurses. In addition, 12% of physicians and CHWs were former smokers (Hidalgo et al., 2016). In the USA, only 6% of physicians reported tobacco smoking in the past week (Bazargan et al., 2009).

The results of our study revealed that about half of the physicians slept 6-8 hours per day. The majority of physicians under 35 years old (83.3%) slept <6 hours per day. This could be due to junior physicians used to work for longer duration and many work shifts particularly during the residency training (Barnett, 2014). The inadequate sleeping hours might be associated with bad health status in contrast to those who reported an average sleeping duration ≥6 hours per day. In Brazil, a nationwide survey of primary health care workers revealed that about 50% of physicians slept 3-6 hours during night (Hidalgo et al., 2016). In the USA, 33.7% of 763 physicians in California had only ≤6 hours of sleep daily (Bazargan et al., 2009).

The recommended daily intake of fruits/vegetables is five or more portions (Joint WHO/FAO Expert Consultati, 2003). In this study, only 11.5% of physicians consumed ≥ 5 portions per day and most physicians ate <3 portions daily. However, higher proportions of healthcare workers in Brazil consumed ≥5 portions of fruit/ vegetable daily (36%, 28.8%, and 26% of doctors, nurses, and CHWs, respectively) (Hidalgo et al., 2016). In Saudi Arabia, three-fourths of health professionals at primary health care centres in Riyadh had >50% on the healthy diet score with no significant difference between physicians and nurses (Al-Ateeq & AlArawi, 2014). In our study, 47.7% of physicians spent <3 hours watching TV on normal weekends, which was more likely physicians who were <35 years old (62.9%), and those working at specialty hospitals (49.2%). This might be because of work load and the educational tasks required from junior physicians. It was also reported that most of the primary healthcare workers in Brazil reported that they watch TV for ≤3 hours on weekends with doctors were less likely watching TV than nurses and CHWs (Hidalgo et al., 2016).

Our results revealed that about two-thirds of studied physicians were physically active, according to the IPAQ. This was more likely among young, highly qualified doctors with work experience ≥ 5 years. Physical activity was linked with good health status among physicians. Similarly, a cross-sectional survey of physicians in California, reported that 64.6% practiced moderate to vigorous exercise (Bazargan et al., 2009). In Saudi Arabia, >50% of Saudi physicians reported physical exercise (Al Alwan et al., 2013). Similar results were recorded among primary healthcare works in Brazil (Hidalgo et al., 2016). However, a lower proportion was recorded in primary healthcare professionals in Riyadh (21.1%, n=68), which can be explained by different tools used to assess physical activity (Al-Ateeq & AlArawi, 2014). Meanwhile, in Estonia, >90% of electronically surveyed family doctors were physically active (Suija et al., 2010). The higher prevalence of being physically active among Europeans can be due to different cultures.

Despite the knowledge gained by physicians and healthcare workers about the health hazards of obesity, they are not immune against obesity. Our study revealed about three quarters of physicians had overweight /obese. Obesity was more likely among male physicians who were ≥35 years old. Perhaps this is because females are more caring of their body shape, particularly the young.

Correspondingly, only one third of primary health workers in Riyadh were normal weight (Al-Ateeq & Al Arawi, 2014), 60.2% of male physicians in Poland were over-weight or obese (Biernat et al., 2012), and 38% of primary health workers in the USA (n=498) were overweight and 15% were obese (Bleich et al., 2012). Meanwhile, 63% of physicians in Estonia were normal weight (Suija et al., 2010).

Preparedness on health promotion practices

Healthcare personnel caring for patients with NCDs are recommended to be well-prepared to talk with their patients on health promoting behaviours such as healthy diet, exercise, weight control, as well as to guide cancer patients to follow sound lifestyle behaviours for better prognosis. The results of this study showed that <25% of physicians were prepared to provide counselling about healthy nutrition and physical exercise, 32.7% were prepared to give advice about weight control, and more than half were unprepared to provide counselling about breast cancer and cervical cancers. Correspondingly, unsatisfactory awareness of 206 primary healthcare professionals working for five polyclinics in the Riyadh Province about hospitals' health promotion programs was recorded and training programs to improve health promoting practices within hospitals were recommended (Altamimi et al., 2016). In line with our results, 36% of health professionals (n.=460) dealing with cancer patients had no idea about lifestyle guidelines for cancer survivors (Williams et al., 2015). However, Hidalgo et al., (2016) recorded higher proportions of very prepared doctors on nutrition (57.1%), exercise (72.5%), weight control (74.2%), breast cancer (69.2%), and cervical cancer (70.3%) related health promoting activities.

Health promoting activities

In our study, healthy diet intake was the most common (95.4%) advice given to patients with NCDs followed by taking medication properly (83.5%). Physical exercise was advised by >50% of physicians, while about one fifth advised their patients to avoid smoking. Alcohol avoidance was advised by minority of physicians because Egypt Saudi Arabia is an Islamic country and alcohol is prohibited in it. Data collected from 890 doctors in the SUN cohort study revealed that 43%, 15% and 13% of them counselled all their patients about smoking cessation, exercise, and weight control and nutrition, respectively. Meanwhile, the proportions of doctors who advised 60-100 of their patients about smoking cessation, exercise, weight control, healthy nutrition, and alcohol avoidance/ reduction were 73%, 58%, 54%, 51%, and 44%, respectively (Carlos et al., 2020). In Brazil, >95% of physicians counselled patients with high BMI, dyslipidaemia, hypertension and type-2 diabetes to eat a healthy diet, be physically active, quit smoking, and avoid alcohol intake. While smoking avoidance, controlling alcohol intake, and taking medications properly were the most frequent advice given to patients with breast cancer and cervical cancers (73.1%, 68.7%, and 54.1%, respectively) (Hidalgo et al., 2016). The differences in proportions are likely due to different levels of training of physicians on health promotion, in addition to different culture and lifestyle behaviours in the different countries.

Sound lifestyle behaviours among health professionals would benefit both health professionals who enjoy better health and their patients who receive counselling to promote these lifestyles in their lives. A consistent association was noticed between doctors who were physically active, adhered to a proper healthy diet, pay attention to health promotion, and spend more time providing counselling and explaining to their patients the best ways to exercise and eat healthy food (Karuguti et al., 2011). In agreement, in this study, physically active doctors were more probably to advise their patients about healthy diet, exercise and smoking avoidance. In addition, an association between adhering to healthy diet and giving counselling on diet and weight was reported in female US physicians (Frank et al., 2002).

Similarly, normal weight physicians were more likely to give advice about weight control and more confident to provide diet and exercise counseling to obese patients than overweight and obese physicians (Bleich et al., 2012). Moreover, eating healthy Mediterranean food, practicing physical activity, and avoidance of smoking in doctors were associated with the longer time they spent promoting the health of their patients (Carlos et al., 2020). In addition, non-smoker physicians were thought more competent to convince patients about smoking cessation than smokers (Mostafa & Momen, 2017). It is clear that health professions are well-oriented about the benefits of healthy lifestyle, as regards diet, exercise, smoking, and sleep. However, they demonstrated unsatisfactory lifestyle. This can be predisposed by poor work environment such as unhealthy food catering and lacking facilities of within work physical activities, work overload, working for long hours, and night shifts (Al-Ateeq & AlArawi, 2014). Unhealthy lifestyle can impact the health of healthcare workers, where only one third of physicians in this study rated their health status as very good/ excellent and three quarters were overweight / obese.

This study has strengths and drawbacks. Regarding the latter, it is a questionnaire-based cross-sectional study, which reflects only the current situation and is not sufficient to prove a relationship between physicians' lifestyle and their health promoting activities. Moreover, subjective information is endangered by recall bias. Further large-scale objective follow-up studies are

recommended to better identify the risk of unhealthy lifestyle on health promotion by physicians. In addition, the reduced response rate (67.7%) in this study might affect the generalization of the results. This low response rate was inevitable due to the circumstance of COVID-19 epidemic that overwhelmed all the health sectors and reduced doctors' ability to take part in the study. However, this study was the first to address lifestyles and health promotion practices among physicians in Egypt. The results of this study would through light on factors affecting health promotion practices by physicians, which is an essential component in the management of NCDs.

5. CONCLUSION

Finally, a considerable proportion of physicians lacked sound lifestyle behaviours such as physical exercise, proper diet, adequate sleep, and normal body weight. This might impact their health and render them unlikely to enhance such behaviours in their patients. The proposed results are expected to raise awareness and will help to develop comprehensive programs to improve clinicians' lifestyle behaviours and health promotion practices.

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Author contributions

Both authors contributed equally to this work.

Ethical approval

The study was approved by the Research Ethics Committee of Benha Faculty of Medicine (RC 11-8-2021).

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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